

RECEIVED

JUL 16 2008

Department of Environmental Quality  
State Air Program

# **Permit-To-Construct Permit Modification/Application Glanbia Foods, Inc.**

Prepared for  
**Glanbia Foods, Inc.**

July 2008

**CH2MHILL**

RECEIVED

JUL 16 2008

Department of Environmental Quality  
State Air Program

# Contents

Section	Page
Contents .....	ii
1.0 Introduction .....	1
2.0 Process Description.....	1
3.0 Emissions Estimates.....	2
3.1 Biogas Compliance Determination.....	2
4.0 Facility Classification.....	3
5.0 Dispersion Modeling .....	4
6.0 Applicable Requirements.....	6
Federal Regulations .....	6
IDAPA Regulations .....	8

## Figure

Figure 1 – Scaled Site Plan

## Appendixes

A	IDEQ PTC Application Forms
B	Emissions Estimates
C	Manufacturer Information
D	Air Dispersion Modeling Protocol
E	Modeling Results
F	Regulatory Requirements

## 1.0 Introduction

Glanbia Foods, Inc. (Glanbia) operates a cheese and whey manufacturing facility located at 1728 South 2300 East, Gooding, Idaho. The facility covers approximately 500 acres of land located about 3.7 miles east of Gooding, Idaho in an attainment area for all criteria pollutants.

Glanbia is requesting a permit modification from the Idaho Department of Environmental Quality (IDEQ) for Permit-To-Construct (PTC), permit number P-2007.0052, currently issued to the Gooding facility. Specifically, Glanbia is proposing to modify their cheese and whey facility in Gooding, Idaho by utilizing biogas generated from their anaerobic digester to operate Boiler No. 2 and Boiler No. 3 for steam generation. The current Permit-to-Construct (PTC) allows biogas to burn in the auxiliary boiler (Boiler No. 5) or the flare but not both concurrently.

Glanbia is proposing to increase biogas production from 433,823 standard cubic feet per day (scf/day) to 505,000 scf/day, resulting in a net increase of 71,177 scf/day. In addition to the primary objective of combusting biogas in Boiler No. 2 and Boiler No. 3, Glanbia would like the operational flexibility to combust biogas for operating Boiler No. 5 concurrently with the flare. In order to give Glanbia the most operational flexibility, the modeling approach is to allow each combustion source to operate concurrently.

The proposed increase in biogas production and operation flexibility will require a modification to four combustion sources: Boiler No. 2, Boiler No. 3, Boiler No. 5, and one industrial open flare.

A scaled plot plan with stack locations is provided in Figure 1.

A pre-permit application meeting about this project was held with IDEQ on May 30, 2008.

An application fee has been included with the application submittal in accordance with IDAPA 58.01.01.226.

## 2.0 Process Description

Glanbia operates a wastewater treatment facility to manage and treat wastewater effluent generated from their bulk cheese and whey operations. Biogas is produced from the anaerobic digester. A blower will be used to distribute biogas to any one or a combination of the following sources at any given time.

- Primarily through a new proposed pipeline to transport biogas to Boiler No. 2 and Boiler No. 3
- Directly to Boiler No. 5
- Directly to the flare

Glanbia is not requesting any increase in the quantity of No. 2 fuel oil (as backup fuel) for the process boilers (Boilers No. 2 and No. 3). Additionally, there are no changes proposed for any of the cheese or whey process lines for this permit modification.

IDEQ permit application forms are provided for the proposed biogas production modification in Appendix A.

### 3.0 Emissions Estimates

Criteria pollutant and toxic air pollutant (TAP) emission estimates have been prepared for two process boilers (Boilers No. 2 and No. 3), Boiler No. 5, and an industrial open flare each combusting biogas.

#### 3.1 Biogas Compliance Determination

Glanbia proposes to monitor the quantity of biogas produced by the anaerobic digester by recording the total biogas flow once per month.

Glanbia is proposing to use a maximum H<sub>2</sub>S concentration of 1,799 parts per million by volume (ppmv) to estimate potential H<sub>2</sub>S and SO<sub>2</sub> emissions for Boiler No. 2, Boiler No. 3, Boiler No. 5, and the industrial flare. The maximum H<sub>2</sub>S concentration value of 1,799 ppmv represents the potential operational COD constraints for the facility on a monthly basis.

Monthly hydrogen sulfide (H<sub>2</sub>S) and sulfur dioxide (SO<sub>2</sub>) emissions will be calculated using the average H<sub>2</sub>S concentration readings of all H<sub>2</sub>S samples taken for each month and the corresponding monthly biogas flow. The calculations for Boiler No. 2, Boiler No. 3, and Boiler No. 5 will be based on a 98% H<sub>2</sub>S control efficiency and a 100% conversion of H<sub>2</sub>S to SO<sub>2</sub>. The calculation for the flare will be based on a 90% H<sub>2</sub>S control efficiency and a 90% conversion of H<sub>2</sub>S to SO<sub>2</sub>.

The primary objective is to combust biogas in Boiler No. 2 and Boiler No. 3 for steam generation. Natural gas will be used in conjunction with biogas to operate Boiler No. 2 and Boiler No. 3 in order to maintain production steam demands. Note that Boiler No. 2 and Boiler No. 3 are existing boilers each with an input rating of 25.1 MMBtu/hr. A biogas gun will be designed to burn up to a maximum of 12,000 standard cubic foot per hour (SCFH) or 7.8 MMBtu/hr assuming a biogas heat value of 650 BTU/SCF. Biogas combustion is approximately 31% of each boilers maximum rated input.

Boiler No. 5 is an existing boiler with a heat input rating of 16.73 MMBtu/hr and has the capability to burn either natural gas or biogas. Under a worse case emissions scenario, Boiler No. 5 will combust biogas. Therefore, biogas emission estimates for Boiler No. 5 are based on a net increase of 71,177 scf/day.

An open industrial flare is used to burn biogas fuel under extreme circumstances. The current amount of biogas available to burn in the flare is 11.75 MMBtu/hr based on the biogas production of 433,823 scf/day and a biogas heat content of 650 BTU/scf. Glanbia will be able to increase maximum biogas production to 505,000 scf/day. Therefore, biogas emission estimates for the flare are based on a net increase of 71,177 scf/day with exception of SO<sub>2</sub> emissions. The SO<sub>2</sub> emissions for the flare are based on the entire 505,000 scf/day because the flare SO<sub>2</sub> emissions were not calculated or accounted for previously.

Emission estimates were based on the following combustion equipment design specifications and biogas production increase assumptions:

---

**Boiler No. 2:**

- Heat input rating of 25.1 MMBtu/hr
- Biogas gun maximum rating of 12,000 SCFH or heat input rating of 7.8MMBtu/hr (31% Max Biogas production)
- Heat input rating of 17.3 MMBtu/hr operating on natural gas
- Emission estimates based on biogas and natural gas (NG) combined net increase

**Boiler No. 3:**

- Heat input rating of 25.1 MMBtu/hr
- Biogas gun maximum rating of 12,000 SCFH or heat input rating of 7.8MMBtu/hr (31% Max Biogas production)
- Heat input rating of 17.3 MMBtu/hr operating on natural gas
- Emission estimates based on biogas and NG combined net increase

**Boiler No. 5:**

- Heat input rating of 16.73 MMBtu/hr
- Emission estimates based on biogas net increase of 71,177 scf/day

**Flare:**

- Heat input rating increase of 1.93 MMBtu/hr
- Emission estimates based on biogas net increase of 71,177 scf/day (except SO<sub>2</sub>)
- SO<sub>2</sub> emission estimates are based on the entire 505,000 scf/day because the flare SO<sub>2</sub> emissions were not estimated or accounted for previously (*worse case SO<sub>2</sub> emissions were estimated only for Boiler No. 5...flare and Boiler No. 5 are currently permitted to not operate concurrently*).

Toxic Air Pollutants (TAPs) emissions were estimated and compared to the screening emission limits (EL) specified in IDAPA 58.01.01.585 and 586. Modeling was performed for those TAPs whose emission estimate is greater than the EL.

Emission estimates are included in Appendix B and the manufacturer information will be included in Appendix C.

## **4.0 Facility Classification**

The Gooding facility is classified as a minor facility because its PTE is less than major source thresholds without requiring PTE limits. The facility is not a designated facility as defined in IDAPA 58.01.01.006. The facility is not a major source as defined in IDAPA 58.01.01.008 for the Title V program.

The facility is located in Gooding County which is classified as unclassifiable for all criteria air pollutants (i.e., PM<sub>10</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, lead, and ozone).

## 5.0 Dispersion Modeling

An air dispersion modeling protocol was prepared by CH2M HILL and submitted to IDEQ via e-mail on June 13, 2008. A hardcopy of the air dispersion modeling protocol is included in Appendix D.

The source parameters and modeling assumptions are identified within the modeling protocol. Stack parameters for Boilers No. 2, 3, and 5 are derived from Cleaver Brooks manufacturer specifications. The flare parameters are based on the SCREEN3 User's Guide. Typical boiler operation for Boilers No. 2, 3 and 5 is near 90% of load input capacity. Therefore, stack parameter information is based on Cleaver Brooks exhaust data operating at a firing rate of 100% of the rated heat input capacity. For the flare, SCREEN3 User's Guide (EPA, 1995) was used to calculate the equivalent stack diameter and height. Note that the manufacturer states that Boiler No. 2 and Boiler No. 3 will have the ability to burn biogas without a change in air discharge flows.

Additionally, the SCREEN 3 default parameters for the flare buoyancy calculation were used for stack temperature and velocity. The calculations for the adjusted flare diameter and stack height are provided below.

## Flare Equivalent Diameter and Stack Height calculations

The equivalent stack diameter uses the net heat release.

$$d = 9.88 \times 10^{-4} (q_n)^{1/2}$$

The net heat release uses the heat release of the biogas from the flare

$$q_n = (0.45) q$$

$q$  = gross heat release from the flare (cal/s)

$q_n$  = net heat release from the flare (cal/s)

$$\begin{aligned} q &= \text{Max bio gas production (505,000 scf/day)} \times \text{Fuel heat value (650 BTU/scf)} \\ &= [328,250,000 \text{ BTU/day} \times 252 \text{ cal/BTU}] / [24 \times 3600 \text{ seconds/day}] \\ &= 957,396 \text{ cal/s} \end{aligned}$$

$$\begin{aligned} q_n &= 0.45 \times 957,396 \text{ cal/s} \\ &= 430,828 \text{ cal/s} \end{aligned}$$

Now that the value for the new heat release of the biogas is determined, the equivalent diameter is

$$\begin{aligned} d &= 9.88 \times 10^{-4} (430,828 \text{ cal/s})^{1/2} \\ &= 0.65 \end{aligned}$$

The physical stack height of the flare is adjusted in the EPA method by adding the length of the flame to the height of the top of the flare structure using the formula:

$$\begin{aligned} H_a &= H_s + [(4.56 \times 10^{-3})(q^{0.478})] \\ H_a &= \text{Adjusted flare height (m)} \\ H_s &= \text{Physical flare height (m)} \\ q &= \text{gross heat release (cal/s) input by user} \end{aligned}$$

$$\begin{aligned} H_a &= 4.87 \text{ m} + [(4.56 \times 10^{-3})(957,396 \text{ cal/s}^{0.478})] \\ &= 8.17 \text{ m} \end{aligned}$$

Air dispersion modeling was conducted in accordance with the modeling protocol. Ambient air is also defined within the protocol. Preliminary modeling, based on the proposed biogas production increase, was performed to evaluate if the modeled concentrations were above the applicable significant contribution levels (SCLs) for PM<sub>10</sub>, NO<sub>x</sub>, and SO<sub>2</sub>. The PM<sub>10</sub> modeled concentrations were 1.68 ug/m<sup>3</sup> for the 24-hr averaging time and 0.36 ug/m<sup>3</sup> for the annual averaging time. Therefore, the PM<sub>10</sub> modeling is complete since the resulting impacts are below five for the 24-hr averaging time and one for the annual averaging time. The results of the preliminary modeling are included in Appendix E.

Preliminary modeling results for NO<sub>x</sub> and SO<sub>2</sub> exceed the SCLs. Therefore, a more refined analysis was performed to evaluate the facility-wide impacts to establish compliance with the NO<sub>x</sub> and SO<sub>2</sub> National Ambient Air Quality Standards (NAAQS).

The NO<sub>x</sub> and SO<sub>2</sub> facility-wide assessment included the sources listed in Table 5 of the IDEQ approved modeling protocol. The three natural gas roof-mounted heaters listed in Table 5 of the protocol were combined into one volume source for modeling purposes.

Appendix E summarizes the modeling results in comparison to the NO<sub>x</sub> and SO<sub>2</sub> NAAQS. The modeled maximum NO<sub>x</sub> and SO<sub>2</sub> concentration results were added to the background concentration for each pollutant and averaging period to determine the overall maximum concentration. Background concentrations used in this refined modeling analysis were provided by Darrin Mehr, IDEQ, via e-mail on July 1, 2008. The overall maximum concentrations for each pollutant and averaging period were less than the regulatory standards.

An additional analysis was also performed for TAPs. Idaho TAPs were first screened against the hourly emission levels in IDAPA 58.01.01.585 and IDAPA 58.01.01.586. Dispersion modeling was required for TAPs exceeding screening levels, which included formaldehyde, arsenic, chromium, and nickel. CH2M HILL successfully demonstrated compliance with Idaho TAPs acceptable ambient concentrations for carcinogens. Detailed emissions screening for criteria pollutants and TAPs are provided with the emission estimates in Appendix B and TAP modeling results are summarized in Appendix E.

## 6.0 Applicable Requirements

A regulatory analysis was performed for the biogas production increase permit modification at the Gooding facility to determine the applicability of the state and federal air quality regulations. The regulatory applicability determinations are included in this section.

The following sections address air quality regulatory compliance requirements for the two process boilers (Boiler No. 2 and Boiler No. 3), Boiler No. 5, and the industrial flare. As detailed below, the sources will comply with all applicable Idaho air quality regulations codified in Idaho Administrative Procedure Act (IDAPA) 58.01.01, as well as US Environmental Protection Agency (EPA) Federal regulations.

### Federal Regulations

#### EPA New Source Performance Standard (NSPS) Subpart Dc

The boilers are subject to EPA New Source Performance Standard (NSPS) at 40 CFR Part 60, Subpart Dc (Standards Of Performance For Small Industrial-Commercial-Institutional Steam Generating Units). Subpart Dc applies to boilers with heat input greater than 10 million Btu per hour (MM Btu/hr), but no more than 100 MM Btu/hr. Subpart Dc imposes sulfur dioxide (SO<sub>2</sub>) and particulate matter (PM) emission limits on boilers that burn oil, wood, or coal. Boilers such as Glanbia's that have the ability to burn distillate fuel oil or gaseous fuels have very limited requirements. The NSPS does not establish emission standards for units that burn gaseous fuel; emission standards are limited to units that burn oil, wood, or coal.

#### SO<sub>2</sub> Standard and Performance Tests

SO<sub>2</sub> standards for boilers are defined at 40 CFR 60.42c. Oil-fired units are subject to requirements at 40 CFR 60.42c(d) that establish an SO<sub>2</sub> emission standard of 0.50 lb/million Btu or, alternatively, a fuel oil sulfur limit of 0.5 weight percent sulfur. Glanbia's process boilers will employ distillate fuel oil (No. 2 fuel oil) that meets the fuel sulfur content limit to comply with this provision.



The provisions at 40 CFR 60.42c(h)(1) allow units burning distillate oil (e.g., No. 2 fuel oil) to demonstrate compliance based on certification from the fuel supplier. The specific procedures for demonstrating compliance is specified at 40 CFR 60.48c(f)(1), and requires the name of the oil supplier, and a statement from the oil supplier that the oil complies with the specifications under the definition of "distillate oil" in 40 CFR 60.41c. The regulatory definition of "distillate oil" cites oils meeting American Society for Testing and Materials (ASTM) standards for number 1 or 2 fuel oils.

For the purpose of the initial performance test to demonstrate compliance with the SO<sub>2</sub> standards, provisions at 40 CFR 60.44c(h) allow the initial performance test to be comprised of certification from the fuel supplier per 40 CFR 60.48c(f)(1) (see above).

### **PM Emission Limits and Performance Tests—Not Applicable**

PM emission limits are defined at 40 CFR 60.43c. PM emission limits for units that burn oil are only applicable to units greater than 30 MM Btu/hr heat input, per 40 CFR 60.43c(c), and are limited to opacity standards. Glanbia's boilers are smaller than the 30 MM Btu/hr threshold, so the NSPS does not impose a PM limit.

### **Recordkeeping and Reporting**

NSPS recordkeeping and reporting requirements are specified at 40 CFR 60.48c. Limited recordkeeping and reporting provisions apply to boilers that do not burn oil, wood, or coal (and are not subject to NSPS emission standards). Provisions applicable to Glanbia's units are as follow:

- **40 CFR 60.48c(a) – Notifications (Boilers No. 2, 3 and 5)** – Notice of date of construction, anticipated startup, and actual startup per 40 CFR 60.7 (NSPS General Provisions) are required. The notification must include the design heat input capacity, and the annual capacity factor anticipated based on all fuels fired and based on each individual fuel fired.
- **40 CFR 60.48c(d) – Fuel Sulfur Records (Boilers No. 2 and No.3)** – Since the process boilers are subject to the SO<sub>2</sub> emission limits and fuel oil sulfur limits per 40 CFR 60.42c when combusting fuel oil, reports must be submitted semiannually (per 40 CFR 60.48c(j)) regarding fuel certification per 40 CFR 60.48c(e)(11). The report must include a certified statement signed by the owner or operator that the records of fuel supplier certifications submitted represent all of the fuel combusted during the reporting period. The fuel supplier certification must include the name of the oil supplier, and a statement from the oil supplier that the oil complies with the specifications under the definition of distillate oil in 40 CFR 60.41c (ASTM No. 1 or 2 fuel oil). *Note that Glanbia has not burned No. 2 fuel oil in these boilers to date.*
- **40 CFR 60.48c(g) – Daily Fuel Use (Boilers No. 2, 3 and 5)** – Records of the amount of each fuel combusted during each day must be recorded and maintained. Records must be maintained for two years, per 40 CFR 60.48c(i). Glanbia has received a letter dated 13 July 2005 allowing a variance from daily fuel tracking to monthly. A copy of the EPA letter is included in Appendix F.

## **EPA NSPS Flare Requirements—Not Applicable**

The NSPS General Provisions define performance standards for flares used to comply with a NSPS or National Emission Standard for Hazardous Air Pollutants (NESHAP).

Glanbia's flare will be used to burn off excess biogas that the facility does not need or is not able to burn. Per 40 CFR 60.18(a), the NSPS flare requirements beginning at 40 CFR 60.18(b) are "requirements for control devices used to comply with applicable subparts of parts 60 and 61." That is, the provisions are only applicable if the flare is used to comply with 40 CFR parts 60 (NSPS) and 61 (NESHAP).

The wastewater treatment that generates the biogas is not subject to any of the subparts of parts 60 and 61, and the flare requirements beginning at 40 CFR 60.18(b) are therefore not applicable.

## **IDAPA Regulations**

### **Particulate Matter Standard for Boilers—IDAPA 58.01.01.675**

The boilers meet the regulatory definition of "fuel-burning equipment" at IDAPA 58.01.01.41:

*Fuel-burning equipment. Any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer.*

The boilers are therefore subject to IDAPA regulations beginning at IDAPA 58.01.01.675 (Fuel Burning Equipment—Particulate Matter). The regulations define maximum allowable concentrations of particulate matter (PM) for gas and liquid fuels of 0.015 and 0.050 grains per dry standard cubic foot (gr/dscf), respectively, at 3 percent oxygen.

As detailed in Appendix F (Table F-1), PM emissions will be below the applicable IDAPA standard, for the two process boilers (Boilers No. 2 and Boiler No. 3) and Boiler No. 5.

### **Distillate Fuel Oil Sulfur Limit—IDAPA 58.01.01.728**

IDAPA regulations beginning at IDAPA 58.01.01.725 (Rules for Sulfur Content of Fuels) limit sulfur content of various fuels in Idaho. The distillate fuel oil combusted in the dual fuel boilers will be limited to 0.5 percent sulfur, per IDAPA 58.01.01.728 (Distillate Fuel Oil). Fuel purchased for use in the dual fuel boilers will not exceed the 0.5 percent sulfur standard.

### **Particulate Matter Standard for Incinerators—IDAPA 58.01.01.786.01**

The flare is used to destroy excess biogas (when Boilers No. 2, 3 and 5 are not operational or operating below biogas production rates) meets the definition of "incinerator" per regulations at IDAPA 58.01.01.51:

*Incinerator. Any source consisting of a furnace and all appurtenances thereto designed for the destruction of refuse by burning. "Open Burning" is not considered incineration. For purposes of these rules, the destruction of any combustible liquid or gaseous material by burning in a flare stack shall be considered incineration.*

The flare is therefore subject to regulations beginning at IDAPA 58.01.01.785 (Rules for Control of Incinerators). A PM standard is defined at IDAPA 58.01.01.786.01, based on pounds of "refuse" burned:

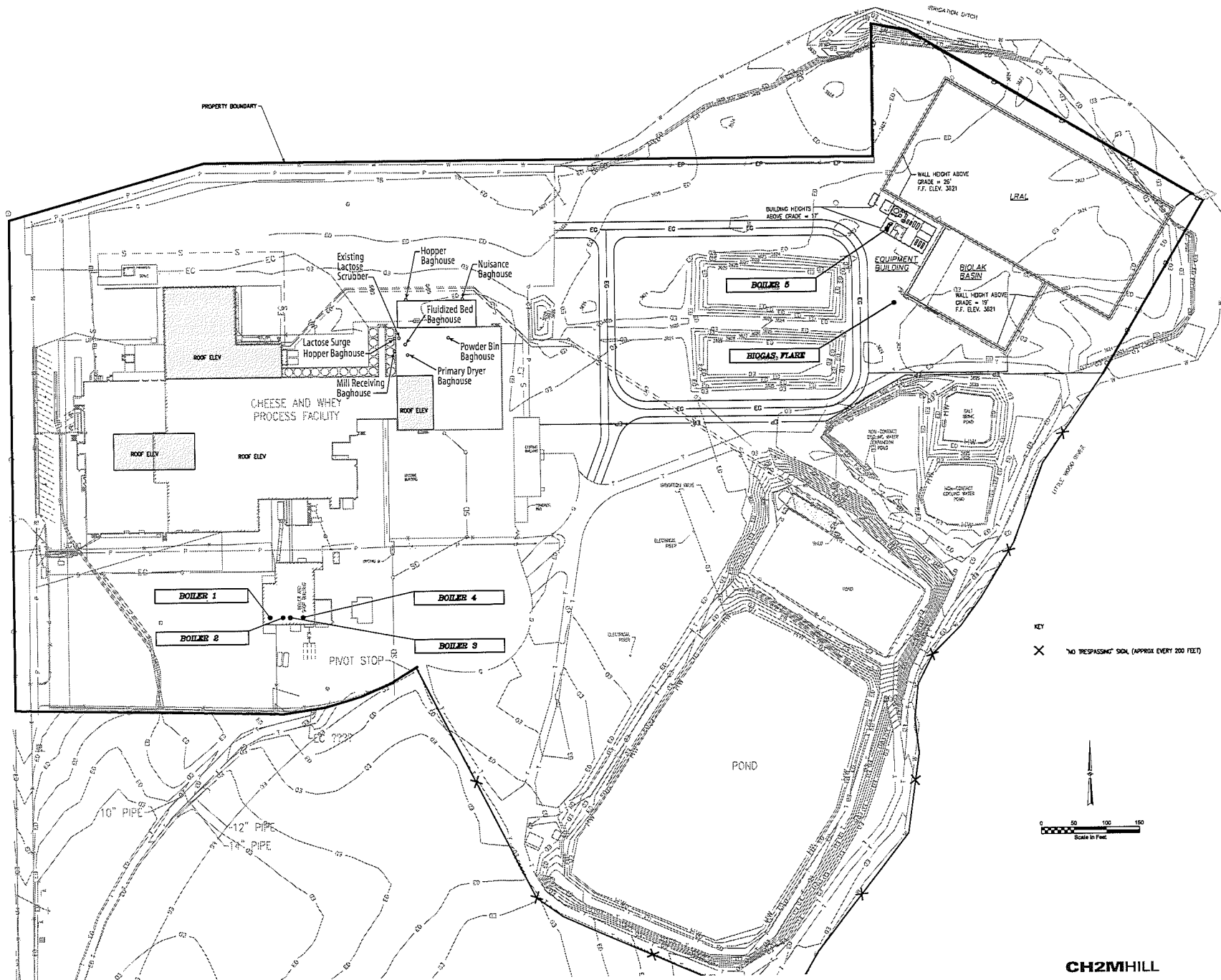
*.01      General Restrictions. No person shall allow, suffer, cause or permit any incinerator to discharge more than two-tenths (0.2) pounds of particulate per one hundred (100) pounds of refuse burned.*

The term "refuse" is not defined in the air quality regulations at IDAPA 58.01.01. The flare is used to destruct excess biogas. For the purpose of this regulatory review, the "refuse" burned is considered to be biogas.

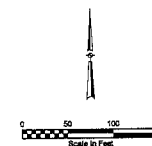
As detailed in Appendix F (Table F-2), PM emissions from biogas combustion will not exceed the 0.2 pounds per 100 pounds of refuse standard.

Figure 1  
**Scaled Plot Plan**

---



KEY  
X "NO TRESPASSING" SIGN (APPROX EVERY 200 FEET)

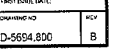
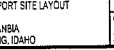
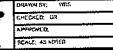
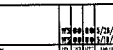


**CH2MHILL**

AIR PERMIT SUPPORT SITE LAYOUT  
GLANBIA  
GOODING, IDAHO

PROJECT NO. D-5694.800  
REV. 8

PORTION OF THIS DRAWING IS NOT LIMITED TO ALL CONDITIONS, A COMPLETE  
DRAWING, INCLUDING ALL NECESSARY NOTES, IS REQUIRED FOR THE PROPER  
UNDERSTANDING OF THIS DRAWING. IT IS THE RESPONSIBILITY OF THE USER  
TO OBTAIN ALL NECESSARY INFORMATION FROM THE PROJECT FILES AND  
NOT TO RELY ON THIS DRAWING AS A SUBSTITUTE FOR THE PROJECT FILES. IT IS THE USER'S  
RESPONSIBILITY TO OBTAIN ALL NECESSARY INFORMATION FROM THE PROJECT FILES AND  
NOT TO RELY ON THIS DRAWING AS A SUBSTITUTE FOR THE PROJECT FILES.



Appendix A

**IDEQ PTC Application Forms**

---



**DEQ AIR QUALITY PROGRAM**  
 1410 N. Hilton, Boise, ID 83706  
 For assistance, call the  
**Air Permit Hotline – 1-877-5PERMIT**

# PERMIT TO CONSTRUCT APPLICATION

Revision 2  
 02/13/07

Please see instructions on page 2 before filling out the form.

## COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

1. Company Name Glanbia Foods, Inc.  
 2. Facility Name Glanbia Foods, Gooding Facility 3. Facility ID No. 047-00008  
 4. Brief Project Description Biogas production increase  
 - One sentence or less

## PERMIT APPLICATION TYPE

5. ☐ New Facility ☐ New Source at Existing Facility ☐ Unpermitted Existing Source  
☒ Modify Existing Source: Permit No.: P-2008.0065 Date Issued: 6/26/08  
☐ Required by Enforcement Action: Case No.: \_\_\_\_\_  
 6. ☒ Minor PTC ☐ Major PTC

## FORMS INCLUDED

Include	N/A	Forms	DEQ Verify
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Form GI – Facility Information	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Form EU0 – Emissions Units General	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form EU1 - Industrial Engine Information Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form EU2 - Nonmetallic Mineral Processing Plants Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form EU3 - Spray Paint Booth Information Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form EU4 - Cooling Tower Information Please Specify number of forms attached: _____	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Form EU5 – Boiler Information Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form HMAP – Hot Mix Asphalt Plant Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form CBP - Concrete Batch Plant Please Specify number of forms attached: _____	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form BCE - Baghouses Control Equipment	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Form SCE - Scrubbers Control Equipment	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Forms EI-CP1 - EI-CP4 - Emissions Inventory– criteria pollutants (Excel workbook, all 4 worksheets)	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	PP – Plot Plan	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Forms MI1 – MI4 – Modeling (Excel workbook, all 4 worksheets)	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Form FRA – Federal Regulation Applicability	<input type="checkbox"/>

## DEQ USE ONLY

Date Received

Project Number

Payment / Fees Included?

Yes ☐ No ☐

Check Number





DEQ AIR QUALITY PROGRAM  
1410 N. Hilton, Boise, ID 83706  
For assistance, call the  
Air Permit Hotline - 1-877-5PERMIT

# PERMIT TO CONSTRUCT APPLICATION

Revision 2  
02/13/07

Please see instructions on page 2 before filling out the form.

**All information is required. If information is missing, the application will not be processed.**

## IDENTIFICATION

1. Company Name	Glanbia Foods, Inc.
2. Facility Name (if different than #1)	Glanbia Foods, Gooding Facility
3. Facility I.D. No.	047-00008
4. Brief Project Description:	

## FACILITY INFORMATION

5. Owned/operated by: (√ if applicable)	<input type="checkbox"/> Federal government <input type="checkbox"/> County government <input type="checkbox"/> State government <input type="checkbox"/> City government
6. Primary Facility Permit Contact Person/Title	Todd Hughes, Environmental Manager
7. Telephone Number and Email Address	(208) 934-9835 thughes@glanbiausa.com
8. Alternate Facility Contact Person/Title	Doug Pettinger, Environmental Director
9. Telephone Number and Email Address	dpettinger@glanbiausa.com
10. Address to which permit should be sent	1728 South 2300 East
11. City/State/Zip	Gooding, Idaho 83330
12. Equipment Location Address (if different than #9)	
13. City/State/Zip	
14. Is the Equipment Portable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
15. SIC Code(s) and NAISC Code	Primary SIC: 3023    Secondary SIC (if any):    NAICS: 311514
16. Brief Business Description and Principal Product	Cheese and Whey Processing
17. Identify any adjacent or contiguous facility that this company owns and/or operates	

## PERMIT APPLICATION TYPE

18. Specify Reason for Application	<input type="checkbox"/> New Facility <input type="checkbox"/> New Source at Existing Facility <input checked="" type="checkbox"/> Modify Existing Source: Permit No.: <u>P-2008.0065</u> Date Issued: <u>3/23/07</u> <input type="checkbox"/> Unpermitted Existing Source: <input type="checkbox"/> Required by Enforcement Action: Case No.:
------------------------------------	---

## CERTIFICATION

IN ACCORDANCE WITH IDAPA 58.01.01.123 (RULES FOR THE CONTROL OF AIR POLLUTION IN IDAHO), I CERTIFY BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION IN THE DOCUMENT ARE TRUE, ACCURATE, AND COMPLETE.

19. Responsible Official's Name/Title	Barner Kreuger, Vice President of Technical Services	
20. RESPONSIBLE OFFICIAL SIGNATURE	<i>Barney Kreuger</i>	Date: <u>7-1-2008</u>
21. <input checked="" type="checkbox"/> Check here to indicate you would like to review a draft permit prior to final issuance.		





DEQ AIR QUALITY PROGRAM  
1410 N. Hilton, Boise, ID 83706  
For assistance, call the  
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**

# PERMIT TO CONSTRUCT APPLICATION

Revision 3  
03/27/07

Please see instructions on page 2 before filling out the form.

## IDENTIFICATION

Company Name: Glanbia Foods, Inc.	Facility Name: Glanbia Foods Gooding Facility	Facility ID No: 047-0008
Brief Project Description:	Increase in biogas production	

## EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

1. Emissions Unit (EU) Name:	FLARE		
2. EU ID Number:	FLARE		
3. EU Type:	<input type="checkbox"/> New Source <input type="checkbox"/> Unpermitted Existing Source <input checked="" type="checkbox"/> Modification to a Permitted Source -- Previous Permit #:		Date Issued:
4. Manufacturer:	VAREC		
5. Model:	244 E		
6. Maximum Capacity:	13.68 MMBTU/HR (Net increase of 1.93 MMBtu/hr)		
7. Date of Construction:	End of October 2008		
8. Date of Modification (if any)	End of October 2008		
9. Is this a Controlled Emission Unit?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes    If Yes, complete the following section. If No, go to line 18.		

## EMISSIONS CONTROL EQUIPMENT

10. Control Equipment Name and ID:	Industrial Flare					
11. Date of Installation:	2005	12. Date of Modification (if any):	August 2008			
13. Manufacturer and Model Number:	Varec, 244 E					
14. ID(s) of Emission Unit Controlled:						
15. Is operating schedule different than emission units(s) involved?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
16. Does the manufacturer guarantee the control efficiency of the control equipment?	<input type="checkbox"/> Yes <input type="checkbox"/> No    (If Yes, attach and label manufacturer guarantee)					
	Pollutant Controlled					
	PM	PM10	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO
Control Efficiency			90%			

17. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. 90% control efficiency approved by DEQ in 2005, Manufacturer info attached

## EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

18. Actual Operation	
19. Maximum Operation	8,760 hours/year

## REQUESTED LIMITS

20. Are you requesting any permit limits?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No    (If Yes, check all that apply below)
<input type="checkbox"/> Operation Hour Limit(s):	8,760 HOURS/YEAR
<input type="checkbox"/> Production Limit(s):	
<input type="checkbox"/> Material Usage Limit(s):	
<input type="checkbox"/> Limits Based on Stack Testing	Please attach all relevant stack testing summary reports
<input type="checkbox"/> Other:	
21. Rationale for Requesting the Limit(s):	



**DEQ AIR QUALITY PROGRAM**  
1410 N. Hilton, Boise, ID 83706  
For assistance, call the  
**Air Permit Hotline – 1-877-5PERMIT**

# PERMIT TO CONSTRUCT APPLICATION

Revision 3  
03/27/07

Please see instructions on page 2 before filling out the form.

## IDENTIFICATION

Company Name: Glanbia Foods, Inc.	Facility Name: Glanbia Foods Gooding Facility	Facility ID No: 047-0008
Brief Project Description: Increase in biogas production		

## EXEMPTION

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

## BOILER (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

1. Type of Request: <input type="checkbox"/> New Unit <input type="checkbox"/> Unpermitted Existing Unit <input checked="" type="checkbox"/> Modification to a Unit with Permit #P-2007.0052		
2. Use of Boiler: <input checked="" type="checkbox"/> % Used For Process <input type="checkbox"/> % Used For Space Heat <input type="checkbox"/> % Used For Generating Electricity <input type="checkbox"/> Other:		
3. Boiler ID Number: Boiler 2	4. Rated Capacity: <input checked="" type="checkbox"/> 25.1 Million British Thermal Units Per Hour (MMBtu/hr) <input type="checkbox"/> 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)	
5. Construction Date: October 2008	6. Manufacturer: Cleaver Brooks	7. Model: CB-600-150ST
8. Date of Modification (if applicable): October 2008	9. Serial Number (if available):	10. Control Device (if any): None <b>Note: Attach applicable control equipment form(s)</b>

## FUEL DESCRIPTION AND SPECIFICATIONS

11. Fuel Type	<input checked="" type="checkbox"/> Diesel Fuel (#2 ) (gal/hr)	<input checked="" type="checkbox"/> Natural Gas (cf/hr)	<input type="checkbox"/> Coal (unit: /hr)	<input checked="" type="checkbox"/> Other Fuels (unit:scf /hr)
12. Full Load Consumption Rate	179	23,744		12,000
13. Actual Consumption Rate				
14. Fuel Heat Content (Btu/unit, LHV)	140000	1056		650 Btu/scf
15. Sulfur Content wt%				
16. Ash Content wt%		N/A		

## STEAM DESCRIPTION AND SPECIFICATIONS

17. Steam Heat Content	NA	NA		
18. Steam Temperature (°F)	N/A	N/A		
19. Steam Pressure (psi)	N/A	N/A		
20. Steam Type	N/A	N/A	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated

## OPERATING LIMITS & SCHEDULE

21. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.): 8760 hours/year
22. Operating Schedule (hours/day, months/year, etc.): 24 hours/day

**PERMIT TO CONSTRUCT APPLICATION**Revision 3  
03/27/07

**DEQ AIR QUALITY PROGRAM**  
1410 N. Hilton, Boise, ID 83706  
For assistance, call the  
**Air Permit Hotline - 1-877-5PERMIT**

Please see instructions on page 2 before filling out the form.

**IDENTIFICATION**

Company Name: Glanbia Foods, Inc.	Facility Name: Glanbia Foods Gooding Facility	Facility ID No: 047-0008
Brief Project Description: Increase in biogas production		

**EXEMPTION**

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

**BOILER (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS**

1. Type of Request: <input type="checkbox"/> New Unit <input type="checkbox"/> Unpermitted Existing Unit <input checked="" type="checkbox"/> Modification to a Unit with Permit #: P-2007.0052		
2. Use of Boiler: <input checked="" type="checkbox"/> % Used For Process <input type="checkbox"/> % Used For Space Heat <input type="checkbox"/> % Used For Generating Electricity		
3. Boiler ID Number: Boiler 3	4. Rated Capacity: <input checked="" type="checkbox"/> 25.1 Million British Thermal Units Per Hour (MMBtu/hr) <input type="checkbox"/> 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)	
5. Construction Date: October 2008	6. Manufacturer: Cleaver Brooks	7. Model: CB-600-150ST
8. Date of Modification (if applicable): October 2008	9. Serial Number (if available):	10. Control Device (if any): None <b>Note: Attach applicable control equipment form(s)</b>

**FUEL DESCRIPTION AND SPECIFICATIONS**

11. Fuel Type	<input checked="" type="checkbox"/> Diesel Fuel (#2 ) (gal/hr)	<input checked="" type="checkbox"/> Natural Gas (cf/hr)	<input type="checkbox"/> Coal (unit: /hr)	<input checked="" type="checkbox"/> Other Fuels (unit: scf /hr)
12. Full Load Consumption Rate	179	23,744		12,000
13. Actual Consumption Rate				650 Btu/scf
14. Fuel Heat Content (Btu/unit, LHV)	140000	1056		
15. Sulfur Content wt%				
16. Ash Content wt%		N/A		

**STEAM DESCRIPTION AND SPECIFICATIONS**

17. Steam Heat Content	NA	NA		
18. Steam Temperature (°F)	N/A	N/A		
19. Steam Pressure (psi)	N/A	N/A		
20. Steam Type	N/A	N/A	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated

**OPERATING LIMITS & SCHEDULE**

21. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.): 8760 hours/year
22. Operating Schedule (hours/day, months/year, etc.): 24 hours/day

## PERMIT TO CONSTRUCT APPLICATION

Revision 3  
03/27/07

IDEQ AIR QUALITY PROGRAM  
1410 N. Hilton, Boise, ID 83706  
For assistance, call the  
Air Permit Hotline - 1-877-5PERMIT

Please see instructions on page 2 before filling out the form.

## IDENTIFICATION

Company Name:  
Glanbia Foods, Inc

Facility Name:  
Glanbia Foods Gooding Facility

Facility ID No:  
047-00008

Brief Project Description:

Increase in biogas production

## EXEMPTION

Please see IDAPA 58.01.01.222 for a list of industrial boilers that are exempt from Permit to Construct requirements.

## BOILER (EMISSION UNIT) DESCRIPTION AND SPECIFICATIONS

1. Type of Request: <input type="checkbox"/> New Unit <input type="checkbox"/> Unpermitted Existing Unit <input checked="" type="checkbox"/> Modification to a Unit with Permit #: P-2007.0052	
2. Use of Boiler: <input checked="" type="checkbox"/> % Used For Process <input type="checkbox"/> % Used For Space Heat <input type="checkbox"/> % Used For Generating Electricity	
3. Boiler ID Number: Boiler 5	4. Rated Capacity: <input checked="" type="checkbox"/> 16.74 Million British Thermal Units Per Hour (MMBtu/hr) <input type="checkbox"/> 1,000 Pounds Steam Per Hour (1,000 lb steam/hr)
5. Construction Date: October 2008	6. Manufacturer: Cleaver Brooks
7. Model: CEW700-400-HW	10. Control Device (if any): None
8. Date of Modification (if applicable): October 2008	9. Serial Number (if available):
Note: Attach applicable control equipment form(s)	

## FUEL DESCRIPTION AND SPECIFICATIONS

11. Fuel Type	<input type="checkbox"/> Diesel Fuel (# /hr) (gal/hr)	<input checked="" type="checkbox"/> Natural Gas (cf/hr)	<input type="checkbox"/> Coal (unit: /hr)	<input checked="" type="checkbox"/> Other Fuels (unit: scf /hr)
12. Full Load Consumption Rate		4,700		21,041
13. Actual Consumption Rate		1056		650 Btu/scf
14. Fuel Heat Content (Btu/unit, LHV)				
15. Sulfur Content wt%				
16. Ash Content wt%		N/A		

## STEAM DESCRIPTION AND SPECIFICATIONS

17. Steam Heat Content	NA	NA		
18. Steam Temperature (°F)	N/A	N/A		
19. Steam Pressure (psi)	N/A	N/A		
20. Steam Type	N/A	N/A	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated	<input type="checkbox"/> Saturated <input type="checkbox"/> Superheated

## OPERATING LIMITS &amp; SCHEDULE

21. Imposed Operating Limits (hours/year, or gallons fuel/year, etc.): 8760 hours/year
22. Operating Schedule (hours/day, months/year, etc.): 24 hours/day



1410 N. Hilton, Boise, ID 83706

For assistance, call the Air Permit

**Hotline - 1-877-5PERMIT**

Company Name:

Glanbia Foods, Inc.

Facility Name:

Glanbia Foods, Gooding Facility

Facility ID No.:

047-00008

**Brief Project Description:**

### Increase in biogas production

Please see instructions on next page before filling out the form.

## BUILDING AND STRUCTURE INFORMATION

[illegible]



**DEQ AIR QUALITY PROGRAM**  
 1410 N. Hilton, Boise, ID 83706  
 For assistance, call the  
**Air Permit Hotline – 1-877-5PERMIT**

# PERMIT TO CONSTRUCT APPLICATION

Revision 2  
 02/14/07

Please see instructions on page 2 before filling out the form.

## IDENTIFICATION

Company Name: Glanbia Foods, Inc.	Facility Name: Glanbia Foods - Gooding Facility	Facility ID No: 047-00008
--------------------------------------	--	------------------------------

Brief Project Description: Increase in biogas production

## APPLICABILITY DETERMINATION

1. Will this project be subject to 1990 CAA Section 112(g)?  
 (Case-by-Case MACT)

☒ NO ☐ YES\*

\* If YES then applicant must submit an application for a case-by-case MACT determination [IAC 567.22-1(3)"b" (8)]

2. Will this project be subject to a New Source Performance Standard?  
 (40 CFR part 60)

☐ NO ☒ YES\*

\*If YES please identify sub-part: Subpart Dc

3. Will this project be subject to a MACT (Maximum Achievable Control Technology) regulation?  
 (40 CFR part 63)

☒ NO ☐ YES\*

\*If YES please identify sub-part: \_\_\_\_\_

THIS ONLY APPLIES IF THE PROJECT EMITS A HAZARDOUS AIR POLLUTANT

4. Will this project be subject to a NESHAP (National Emission Standards for Hazardous Air Pollutants) regulation?  
 (40 CFR part 61)

☒ NO ☐ YES\*

\*If YES please identify sub-part: \_\_\_\_\_

5. Will this project be subject to PSD (Prevention of Significant Deterioration)?  
 (40 CFR section 52.21)

☒ NO ☐ YES

6. Was netting done for this project to avoid PSD?

☒ NO ☐ YES\*

\*If YES please attach netting calculations

**IF YOU ARE UNSURE HOW TO ANSWER ANY OF THESE QUESTIONS, CALL THE AIR PERMIT HOTLINE AT 1-877-5PERMIT**

Appendix B  
**Emissions Estimates**

---

## Glanbia Gooding Biogas Project - Net Increase

### Criteria Pollutants (lb/hr)

	Total Particulate Matter (PM)	Nitrogen Oxides (NOx)	Sulfur Oxides	Carbon Monoxide (CO)	VOC	Lead
Boiler 2 (Combined NG + Biogas)	0.26	3.22	3.56	1.63	0.14	1.42E-05
Boiler 2 (NG Only) - Existing	0.18	2.38	0.01	2.00	0.13	1.19E-05
<b>Boiler 2 Net Increase</b>	<b>0.08</b>	<b>0.84</b>	<b>3.55</b>	<b>-0.37</b>	<b>0.01</b>	<b>2.29E-06</b>
Boiler 3 (Combined NG + Biogas)	0.26	3.22	3.56	1.63	0.14	1.42E-05
Boiler 3 (NG Only) -Existing	0.18	2.38	0.01	2.00	0.13	1.19E-05
<b>Boiler 3 Net Increase</b>	<b>0.08</b>	<b>0.84</b>	<b>3.55</b>	<b>-0.37</b>	<b>0.01</b>	<b>2.29E-06</b>
Boiler 5 (Biogas Only) -Existing	0.12	1.39	6.79	1.76	0.19	5.56E-06
<b>Boiler 5 Net Increase</b>	<b>0.02</b>	<b>0.23</b>	<b>0.87</b>	<b>0.29</b>	<b>0.03</b>	<b>1.48E-06</b>
Flare (Biogas Only) -Existing	0.09	0.80		4.35	0.74	NA
<b>Flare Net Increase</b>	<b>0.01</b>	<b>0.13</b>	<b>5.57</b>	<b>0.71</b>	<b>0.12</b>	<b>NA</b>
<b>Total Net Increase (if all sources run simultaneously)</b>	<b>0.20</b>	<b>2.05</b>	<b>13.54</b>	<b>1.00</b>	<b>0.16</b>	<b>6.07E-06</b>
Idaho Modeling Guidelines for Facility Wide Net Increase Modeling Required	0.20 Yes	NA No	0.20 Yes	14.00 No	NA No	NA No

### Criteria Pollutants (ton/yr)

	Total Particulate Matter (PM)	Nitrogen Oxides (NOx)	Sulfur Oxides	Carbon Monoxide (CO)	VOC	Lead
Boiler 2 (Combined NG + Biogas)	1.16	14.12	15.59	7.14	0.59	6.22E-05
Boiler 2 (NG Only)	0.69	9.12	0.05	7.66	0.50	4.56E-05
<b>Boiler 2 Net Increase</b>	<b>0.47</b>	<b>5.00</b>	<b>15.54</b>	<b>-0.52</b>	<b>0.09</b>	<b>1.66E-05</b>
Boiler 3 (Combined NG + Biogas)	1.16	14.12	15.59	7.14	0.59	6.22E-05
Boiler 3 (NG Only)	0.69	9.12	0.05	7.66	0.50	4.56E-05
<b>Boiler 3 Net Increase</b>	<b>0.47</b>	<b>5.00</b>	<b>15.54</b>	<b>-0.52</b>	<b>0.09</b>	<b>1.66E-05</b>
Boiler 5 (Biogas Only) -Existing	0.51	6.07	29.74	7.72	0.82	2.44E-05
<b>Boiler 5 Net Increase</b>	<b>0.08</b>	<b>1.00</b>	<b>3.82</b>	<b>1.27</b>	<b>0.14</b>	<b>6.49E-06</b>
Flare (Biogas Only) -Existing	0.37	3.50		19.04	3.24	NA
<b>Flare Net Increase</b>	<b>0.06</b>	<b>0.57</b>	<b>24.40</b>	<b>3.12</b>	<b>0.53</b>	<b>NA</b>
<b>Total (if each source used the hourly increase simultaneously, and 8,760 hrs/yr)</b>	<b>1.08</b>	<b>11.57</b>	<b>59.30</b>	<b>4.39</b>	<b>0.85</b>	<b>3.96E-05</b>
Idaho Modeling Guidelines for Facility Wide Net Increase Modeling Required	1.00 Yes	1.00 Yes	1.00 Yes	NA No	NA No	0.60 No



**Toxic Air Pollutants - Non Metals (lb/hr)**

	Boiler 2 (Combined NG + Biogas)	Boiler 3 (Combined NG + Biogas)	Boiler 5	Flare	Total	IDAPA 58.01.01.585/ 586 - EL	PTE Emission Rate vs. EL
Hydrogen sulfide	3.76E-02	3.76E-02	9.28E-03	4.64E-02	1.31E-01	9.33E-01	Below
3-Methylchloranthrene	5.11E-08	5.11E-08	5.34E-09		1.08E-07	2.50E-06	Below
Ammonia	9.08E-02	9.08E-02	9.49E-03	9.49E-03	2.01E-01	1.20E+00	Below
Benzene	1.04E-04	1.04E-04	1.72E-05	4.72E-04	6.97E-04	8.00E-04	Below
Benzo(a)pyrene	3.41E-08	3.41E-08	3.56E-09		7.17E-08	2.00E-06	Below
Ethylbenzene						2.90E+01	Below
Formaldehyde	1.38E-03	1.38E-03	2.22E-04	3.47E-03	6.44E-03	5.10E-04	Exceeds
Hexane	5.11E-02	5.11E-02	5.34E-03		1.08E-01	1.20E+01	Below
Naphthalene	1.73E-05	1.73E-05	1.81E-06		3.64E-05	3.33E+00	Below
PAHs	1.14E-05	1.14E-05	1.19E-06	4.15E-05	6.54E-05	9.10E-05	Below
POM						2.00E-06	Below
Pentane	7.38E-02	7.38E-02	7.71E-03		1.55E-01	1.18E+02	Below
Toluene	9.65E-05	9.65E-05	1.01E-05		2.03E-04	2.50E+01	Below
Methyl chloroform						1.27E+02	Below
o-Xylenes						2.90E+01	Below
2-Methylnaphthalene	6.81E-07	6.81E-07	7.12E-08		1.43E-06		
7,12-Dimethylbenz(a)anthracene	4.54E-07	4.54E-07	4.75E-08		9.56E-07		
Acenaphthene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Acenaphthylene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Anthracene	6.81E-08	6.81E-08	7.12E-09		1.43E-07		
Benz(a)anthracene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Benzo(b)fluoranthene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Benzo(g,h,i)perylene	3.41E-08	3.41E-08	3.56E-09		7.17E-08		
Benzo(k)fluoranthene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Butane	5.96E-02	5.96E-02	6.23E-03		1.25E-01		
Chrysene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Dibenzo(a,h)anthracene	3.41E-08	3.41E-08	3.56E-09		7.17E-08		
Dichlorobenzene	3.41E-05	3.41E-05	3.56E-06		7.17E-05		
Ethane	8.80E-02	8.80E-02	9.19E-03		1.85E-01		
Fluoranthene	8.51E-08	8.51E-08	8.90E-09		1.79E-07		
Fluorene	7.95E-08	7.95E-08	8.30E-09		1.67E-07		
Indeno(1,2,3-cd)pyrene	5.11E-08	5.11E-08	5.34E-09		1.08E-07		
Phenanthrene	4.83E-07	4.83E-07	5.04E-08		1.02E-06		
Propane	4.54E-02	4.54E-02	4.75E-03		9.56E-02		
Pyrene	1.42E-07	1.42E-07	1.48E-08		2.99E-07		

**Toxic Air Pollutants (lb/hr)**

	Boiler 2 (Combined)	Boiler 3 (Combined)	Boiler 5	Flare	Total	IDAPA 58.01.01.585/ 586 - EL	PTE Emission Rate vs. EL
Arsenic	5.68E-06	5.68E-06	5.93E-07		1.19E-05	1.50E-06	Exceeds
Barium	1.25E-04	1.25E-04	1.30E-05		2.63E-04	3.33E-02	Below
Beryllium	3.41E-07	3.41E-07	3.56E-08		7.17E-07	2.80E-05	Below
Cadmium	3.12E-05	3.12E-05	3.26E-06		6.57E-05	3.70E-06	Exceeds
Chromium	3.97E-05	3.97E-05	4.15E-06		8.36E-05	3.33E-02	Below
Cobalt	2.38E-06	2.38E-06	2.49E-07		5.02E-06	3.30E-03	Below
Copper	2.41E-05	2.41E-05	2.52E-06		5.08E-05	1.30E-02	Below
Manganese	1.08E-05	1.08E-05	1.13E-06		2.27E-05	6.70E-02	Below
Mercury	7.38E-06	7.38E-06	7.71E-07		1.55E-05	1.00E-03	Below
Molybdenum	3.12E-05	3.12E-05	3.26E-06		6.57E-05	3.33E-01	Below
Nickel	5.96E-05	5.96E-05	6.23E-06		1.25E-04	2.70E-05	Exceeds
Selenium	6.81E-07	6.81E-07	7.12E-08		1.43E-06	1.30E-02	Below
Vanadium	6.53E-05	6.53E-05	6.82E-06		1.37E-04	3.00E-03	Below
Zinc	8.23E-04	8.23E-04	8.60E-05		1.73E-03	6.67E-01	Below

Glanbia Gooding Cheese-Whey Facility (Boiler 2 burning Biogas and NG)

Boiler Heat Input (MMBtu/hr)		25.1	Notes
Biogas Fuel			
Biogas Fuel Heat Value (Btu/scf)		650	
Max Biogas Usage (scf/hr)		12,000	Biogas gun limit
Max Biogas Usage (scf/day)		288,000	
Max Biogas Heat Input to Boiler (MMBtu/hr)		7.8	(Fuel value) x (usage)
Max Heat Input from Biogas		31%	
Max Biogas Usage (MM cf/hr)		1.20E-02	(Heat input ) / (Heat value)
Operation (hrs/yr)		8,760	
Max Biogas Fuel Use (MM cf/yr)		105	
Biogas Hydrogen Sulfide (H <sub>2</sub> S) Concentration (ppmv)		1,799	
Biogas H <sub>2</sub> S Concentration (mg/m <sup>3</sup> )		2,509	(ppmv) x (MW) / 24.45
Max H <sub>2</sub> S Mass Feedrate (lb/hr)		1.9	
Assumed H <sub>2</sub> S Conversion for SO <sub>2</sub> Emissions		100%	

Natural Gas	
Boiler Heat Input (MMBtu/hr)	17.3
NG Fuel Heat Value (Btu/scf)	1,056
Maximum Firing Rate (MMcf/hr) <sup>1</sup>	1.64E-02
Maximum Firing Rate (MMcf/yr)	144
Operation (hrs/yr)	8,760

Uncontrolled Potential to Emit (Biogas @ max, balance NG)											
Criteria Pollutant	CAS No.	Emission Factor <sup>1</sup>		Biogas			Natural Gas			Combined	
				Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (ton/yr)
		(lb/MM scf)	(lb/MMBtu)								
Total Particulate Matter (PM) <sup>2</sup>		7.600	0.010	0.09	799	0.40	0.17	1,515	0.76	0.26	1.16
Nitrogen Oxides (NOx)		100.000	0.117	1.20	10,512	5.26	2.02	17,731	8.87	3.22	14.12
Sulfur Dioxide (SO <sub>2</sub> ) <sup>3</sup>		mass balance (bio) & 0.6 (NG)		3.53	30,923	15.46	0.03	258	0.13	3.56	15.59
Carbon Monoxide (CO)		84.000	0.036	1.01	8,830	4.42	0.62	5,456	2.73	1.63	7.14
VOC		5.500	0.004	0.07	578	0.29	0.07	606	0.30	0.14	0.59
Lead		5.00E-04		6.00E-06	5.26E-02	2.6E-05	8.19E-06	7.18E-02	3.59E-05	1.42E-05	6.22E-05

					Uncontrolled Potential to Emit				
					Biogas			IDAPA	
Toxic Air Pollutants - H <sub>2</sub> S	CAS No.	Emission Factor <sup>4</sup>			Emission Rate	Emission Rate	Emission Rate	58.01.01.58 5/586 -	PTE Emission
		(% Destruction)			(lb/hr)	(lb/yr)	(ton/yr)	EL (lb/hr)	Rate vs. EL
Hydrogen sulfide	7783-06-4	98%			3.76E-02	6.37E+02	3.19E-01	9.33E-01	Below

					Uncontrolled Potential to Emit								
					Primary Fuel - Biogas <sup>5</sup>			Secondary Fuel - Natural Gas			Both Fuels Combined		
Toxic Air Pollutants - Non-metals <sup>7</sup>	CAS No.	EPA AP-42 Natural Gas Emission Factor (lb/10 <sup>6</sup> scf)		SCAQMD <sup>6</sup> Digester Gas Emission Factor (lb/10 <sup>6</sup> scf)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
3-Methylchloranthrene	56-49-5	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08	2.50E-06	Below
Ammonia	7664-41-7			3.20E+00	3.84E-02	3.36E+02	1.68E-01	5.24E-02	4.59E+02	2.30E-01	9.08E-02	1.20E+00	Below
Benzene	71-43-2	2.10E-03		5.80E-03	6.96E-05	6.10E-01	3.05E-04	3.44E-05	3.01E-01	1.51E-04	1.04E-04	8.00E-04	Below
Benzo(a)pyrene	50-32-8	1.20E-06			1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.50E-02		1.23E-02	1.48E-04	1.29E+00	6.46E-04	1.23E-03	1.08E+01	5.38E-03	1.38E-03	5.10E-04	Exceeds
Hexane	110-54-3	1.80E+00			2.16E-02	1.89E+02	9.46E-02	2.95E-02	2.58E+02	1.29E-01	5.11E-02	1.20E+01	Below
Naphthalene	91-20-3	6.10E-04			7.32E-06	6.41E-02	3.21E-05	9.99E-06	8.75E-02	4.38E-05	1.73E-05	3.33E+00	Below
PAHs	na			4.00E-04	4.80E-06	4.20E-02	2.10E-05	6.55E-06	5.74E-02	2.87E-05	1.14E-05	9.10E-05	Below
Pentane	109-66-0	2.60E+00			3.12E-02	2.73E+02	1.37E-01	4.26E-02	3.73E+02	1.87E-01	7.38E-02	1.18E+02	Below
Toluene	108-88-3	3.40E-03			4.08E-05	3.57E-01	1.79E-04	5.57E-05	4.88E-01	2.44E-04	9.65E-05	2.50E+01	Below
2-Methylnaphthalene	91-57-6	2.40E-05			2.88E-07	2.52E-03	1.26E-06	3.93E-07	3.44E-03	1.72E-06	6.81E-07		
7,12-Dimethylbenz(a)anthracene		1.60E-05			1.92E-07	1.68E-03	8.41E-07	2.62E-07	2.30E-03	1.15E-06	4.54E-07		
Acenaphthene	92-32-9	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Acenaphthylene	203-96-8	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Anthracene	120-12-7	2.40E-06			2.88E-08	2.52E-04	1.26E-07	3.93E-08	3.44E-04	1.72E-07	6.81E-08		
Benz(a)anthracene	56-55-3	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Benzo(b)fluoranthene	205-99-2	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Benzo(g,h,i)perylene	191-24-2	1.20E-06			1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08		
Benzo(k)fluoranthene	205-82-3	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Butane	106-97-8	2.10E+00			2.52E-02	2.21E+02	1.10E-01	3.44E-02	3.01E+02	1.51E-01	5.96E-02		
Chrysene	218-01-9	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Dibenzo(a,h)anthracene	53-70-3	1.20E-06			1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08		
Dichlorobenzene	25321-22-6	1.20E-03			1.44E-05	1.26E-01	6.31E-05	1.97E-05	1.72E-01	8.61E-05	3.41E-05		
Ethane	74-84-0	3.10E+00			3.72E-02	3.26E+02	1.63E-01	5.08E-02	4.45E+02	2.22E-01	8.80E-02		
Fluoranthene	206-44-0	3.00E-06			3.60E-08	3.15E-04	1.58E-07	4.91E-08	4.31E-04	2.15E-07	8.51E-08		
Fluorene	86-73-7	2.80E-06			3.36E-08	2.94E-04	1.47E-07	4.59E-08	4.02E-04	2.01E-07	7.95E-08		
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06			2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Phenanthrene	85-01-8	1.70E-05			2.04E-07	1.79E-03	8.94E-07	2.79E-07	2.44E-03	1.22E-06	4.83E-07		
Propane	74-98-6	1.60E+00			1.92E-02	1.68E+02	8.41E-02	2.62E-02	2.30E+02	1.15E-01	4.54E-02		
Pyrene	129-00-0	5.00E-06			6.00E-08	5.26E-04	2.63E-07	8.19E-08	7.18E-04	3.59E-07	1.42E-07		

Pyrene		129-00-0	5.00E-06	Uncontrolled Potential to Emit								
				Biogas			Natural Gas			Both Fuels Combined		
				Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA EL (lb/hr)	PTE Emission Rate vs. EL
<b>Toxic Air Pollutants-Metals <sup>8</sup></b>	<b>CAS Number</b>	<b>Emission Factor (lb/10<sup>6</sup> scf)</b>										
Arsenic	7440-38-2	2.00E-04		2.40E-06	2.10E-02	1.05E-05	3.28E-06	2.87E-02	1.44E-05	5.68E-06	1.50E-06	Exceeds
Barium	7440-39-3	4.40E-03		5.28E-05	4.63E-01	2.31E-04	7.21E-05	6.31E-01	3.16E-04	1.25E-04	3.33E-02	Below
Beryllium	7440-41-7	1.20E-05		1.44E-07	1.26E-03	6.31E-07	1.97E-07	1.72E-03	8.61E-07	3.41E-07	2.80E-05	Below
Cadmium	7440-43-9	1.10E-03		1.32E-05	1.16E-01	5.78E-05	1.80E-05	1.58E-01	7.89E-05	3.12E-05	3.70E-06	Exceeds
Chromium	7440-47-3	1.40E-03		1.68E-05	1.47E-01	7.36E-05	2.29E-05	2.01E-01	1.00E-04	3.97E-05	3.33E-02	Below
Cobalt	7440-48-4	8.40E-05		1.01E-06	8.83E-03	4.42E-06	1.38E-06	1.21E-02	6.03E-06	2.38E-06	3.30E-03	Below
Copper	7440-50-8	8.50E-04		1.02E-05	8.94E-02	4.47E-05	1.39E-05	1.22E-01	6.10E-05	2.41E-05	1.30E-02	Below
Manganese	7439-96-5	3.80E-04		4.56E-06	3.99E-02	2.00E-05	6.23E-06	5.45E-02	2.73E-05	1.08E-05	6.70E-02	Below
Mercury	7439-97-6	2.60E-04		3.12E-06	2.73E-02	1.37E-05	4.26E-06	3.73E-02	1.87E-05	7.38E-06	1.00E-03	Below
Molybdenum	7439-98-7	1.10E-03		1.32E-05	1.16E-01	5.78E-05	1.80E-05	1.58E-01	7.89E-05	3.12E-05	3.33E-01	Below
Nickel	7440-02-0	2.10E-03		2.52E-05	2.21E-01	1.10E-04	3.44E-05	3.01E-01	1.51E-04	5.96E-05	2.70E-05	Exceeds
Selenium	7782-49-2	2.40E-05		2.88E-07	2.52E-03	1.26E-06	3.93E-07	3.44E-03	1.72E-06	6.81E-07	1.30E-02	Below
Vanadium	1314-62-1	2.30E-03		2.76E-05	2.42E-01	1.21E-04	3.77E-05	3.30E-01	1.65E-04	6.53E-05	3.00E-03	Below
Zinc	7440-66-6	2.90E-02		3.48E-04	3.05E+00	1.52E-03	4.75E-04	4.16E+00	2.08E-03	8.23E-04	6.67E-01	Below

Notes:

Notes:

1 Criteria Pollutants emission rates from manufacturer-supplied emission factors, which are more conservative (higher) than EPA AP-42 factors. Except for Lead, which is from EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2.

Same emission factor applied for biogas and natural gas combustion (similar properties)...no biogas emission factors available

<sup>2</sup> PM emission factor is assumed to equal PM<sub>10</sub>.

<sup>3</sup> SO<sub>2</sub> Emission factor for biogas assumes 100% conversion of H<sub>2</sub>S to SO<sub>2</sub>; for NG (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2).

<sup>4</sup> Conservatively estimated H<sub>2</sub>S destruction based on engineering judgement and combustion properties of H<sub>2</sub>S

<sup>4</sup> Conservatively estimated H<sub>2</sub>S destruction based on engineering judgement and combustion properties of H<sub>2</sub>S.

<sup>5</sup> Biogas toxic air pollutant emissions based on EPA AP-42 emission factors, times ratio of Biogas heat value to natural gas heat value, unless higher emission factor available through local air quality management district (SCAQMD).

<sup>6</sup> Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program".

<sup>7</sup> Toxic Air Pollutant emission factors (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

<sup>8</sup>Toxic Air Pollutant-Metals emission factors (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).

Glanbia Gooding Cheese-Whey Facility (Boiler 3 burning Biogas and NG)

Boiler Heat Input (MMBtu/hr)		25.1	Notes
Biogas Fuel			
Biogas Fuel Heat Value (Btu/scf)		650	
Max Biogas Usage (scf/hr)		12,000	Biogas gun limit
Max Biogas Usage (scf/day)		288,000	
Max Biogas Heat Input to Boiler (MMBtu/hr)		7.8	(Fuel value) x (usage)
Max Heat Input from Biogas		31%	
Max Biogas Usage (MM cf/hr)		1.20E-02	(Heat input ) / (Heat value)
Operation (hrs/yr)		8,760	
Max Biogas Fuel Use (MM cf/yr)		105	
Biogas Hydrogen Sulfide (H <sub>2</sub> S) Concentration (ppmv)		1,799	
Biogas H <sub>2</sub> S Concentration (mg/m <sup>3</sup> )		2,509	(ppmv) x (MW) / 24.45
Max H <sub>2</sub> S Mass Feedrate (lb/hr)		1.9	
Assumed H <sub>2</sub> S Conversion for SO <sub>2</sub> Emissions		100%	

Natural Gas	
Boiler Heat Input (MMBtu/hr)	17.3
NG Fuel Heat Value (Btu/scf)	1,056
Maximum Firing Rate (MMcf/hr) <sup>1</sup>	1.64E-02
Maximum Firing Rate (MMcf/yr)	144
Operation (hrs/yr)	8,760

		Uncontrolled Potential to Emit (Biogas @ max, balance NG)											
						Biogas			Natural Gas			Combined	
		Emission Factor <sup>1</sup>		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (ton/yr)		
Criteria Pollutant	CAS No.	(lb/MM scf)	(lb/MMBtu)										
Total Particulate Matter (PM) <sup>2</sup>		7.600	0.010	0.09	799	0.40	0.17	1,515	0.76	0.26	1.16		
Nitrogen Oxides (NOx)		100.000	0.117	1.20	10,512	5.26	2.02	17,731	8.87	3.22	14.12		
Sulfur Dioxide (SO <sub>2</sub> ) <sup>3</sup>		mass balance (bio) & 0.6 (NG)	0.0017	3.53	30,923	15.46	0.03	258	0.13	3.56	15.59		
Carbon Monoxide (CO)		84.000	0.036	1.01	8,830	4.42	0.62	5,456	2.73	1.63	7.14		
VOC		5.500	0.004	0.07	578	0.29	0.07	606	0.30	0.14	0.59		
Lead		5.00E-04		6.00E-06	5.26E-02	2.6E-05	8.19E-06	7.18E-02	3.59E-05	1.42E-05	6.22E-05		

				Biogas				
Toxic Air Pollutants - H <sub>2</sub> S	CAS No.	Emission Factor <sup>4</sup> (% Destruction)		Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	IDAPA 58.01.01.585/ 586 - EL (lb/hr)	PTE Emission Rate vs. EL
				3.76E-02	6.37E+02	3.19E-01	9.33E-01	Below
Hydrogen sulfide	7783-06-4	98%						

					Uncontrolled Potential to Emit									
					Primary Fuel - Biogas <sup>5</sup>			Secondary Fuel - Natural Gas			Both Fuels Combined			
					Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL	
EPA AP-42 Natural Gas Emission Factor (lb/10 <sup>6</sup> scf)				SCAQMD <sup>6</sup> Digester Gas Emission Factor (lb/10 <sup>6</sup> scf)										
Toxic Air Pollutants - Non-metals <sup>7</sup>	CAS No.													
3-Methylchloranthrene	56-49-5	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08	2.50E-06	Below
Ammonia	7664-41-7			3.20E+00		3.84E-02	3.36E+02	1.68E-01	5.24E-02	4.59E+02	2.30E-01	9.08E-02	1.20E+00	Below
Benzene	71-43-2	2.10E-03		5.80E-03		6.96E-05	6.10E-01	3.05E-04	3.44E-05	3.01E-01	1.51E-04	1.04E-04	8.00E-04	Below
Benzo(a)pyrene	50-32-8	1.20E-06				1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08	2.00E-06	Below
Formaldehyde	50-00-0	7.50E-02		1.23E-02		1.48E-04	1.29E+00	6.46E-04	1.23E-03	1.08E+01	5.38E-03	1.38E-03	5.10E-04	Exceeds
Hexane	110-54-3	1.80E+00				2.16E-02	1.89E+02	9.46E-02	2.95E-02	2.58E+02	1.29E-01	5.11E-02	1.20E+01	Below
Naphthalene	91-20-3	6.10E-04				7.32E-06	6.41E-02	3.21E-05	9.99E-06	8.75E-02	4.38E-05	1.73E-05	3.33E+00	Below
PAHs	na			4.00E-04		4.80E-06	4.20E-02	2.10E-05	6.55E-06	5.74E-02	2.87E-05	1.14E-05	9.10E-05	Below
Pentane	109-66-0	2.60E+00				3.12E-02	2.73E+02	1.37E-01	4.26E-02	3.73E+02	1.87E-01	7.38E-02	1.18E+02	Below
Toluene	108-88-3	3.40E-03				4.08E-05	3.57E-01	1.79E-04	5.57E-05	4.88E-01	2.44E-04	9.65E-05	2.50E+01	Below
2-Methylnaphthalene	91-57-6	2.40E-05				2.88E-07	2.52E-03	1.26E-06	3.93E-07	3.44E-03	1.72E-06	6.81E-07		
7,12-Dimethylbenz(a)anthracene		1.60E-05				1.92E-07	1.68E-03	8.41E-07	2.62E-07	2.30E-03	1.15E-06	4.54E-07		
Acenaphthene	92-32-9	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Acenaphthylene	203-96-8	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Anthracene	120-12-7	2.40E-06				2.88E-08	2.52E-04	1.26E-07	3.93E-08	3.44E-04	1.72E-07	6.81E-08		
Benz(a)anthracene	56-55-3	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Benzo(b)fluoranthene	205-99-2	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Benzo(g,h,i)perylene	191-24-2	1.20E-06				1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08		
Benzo(k)fluoranthene	205-82-3	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Butane	106-97-8	2.10E+00				2.52E-02	2.21E+02	1.10E-01	3.44E-02	3.01E+02	1.51E-01	5.96E-02		
Chrysene	218-01-9	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Dibenzo(a,h)anthracene	53-70-3	1.20E-06				1.44E-08	1.26E-04	6.31E-08	1.97E-08	1.72E-04	8.61E-08	3.41E-08		
Dichlorobenzene	25321-22-6	1.20E-03				1.44E-05	1.26E-01	6.31E-05	1.97E-05	1.72E-01	8.61E-05	3.41E-05		
Ethane	74-84-0	3.10E+00				3.72E-02	3.26E+02	1.63E-01	5.08E-02	4.45E+02	2.22E-01	8.80E-02		
Fluoranthene	206-44-0	3.00E-06				3.60E-08	3.15E-04	1.58E-07	4.91E-08	4.31E-04	2.15E-07	8.51E-08		
Fluorene	86-73-7	2.80E-06				3.36E-08	2.94E-04	1.47E-07	4.59E-08	4.02E-04	2.01E-07	7.95E-08		
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06				2.16E-08	1.89E-04	9.46E-08	2.95E-08	2.58E-04	1.29E-07	5.11E-08		
Phenanathrene	85-01-8	1.70E-05				2.04E-07	1.79E-03	8.94E-07	2.79E-07	2.44E-03	1.22E-06	4.83E-07		
Propane	74-98-6	1.60E+00				1.92E-02	1.68E+02	8.41E-02	2.62E-02	2.30E+02	1.15E-01	4.54E-02		
Pyrene	129-00-0	5.00E-06				6.00E-08	5.26E-04	2.63E-07	8.19E-08	7.18E-04	3.59E-07	1.42E-07		

				Uncontrolled Potential to Emit								
				Biogas			Natural Gas			Both Fuels Combined		
				Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
Toxic Air Pollutants-Metals <sup>B</sup>	CAS Number	Emission Factor (lb/10 <sup>6</sup> scf)										
Arsenic	7440-38-2	2.00E-04		2.40E-06	2.10E-02	1.05E-05	3.28E-06	2.87E-02	1.44E-05	5.68E-06	1.50E-06	Exceeds
Barium	7440-39-3	4.40E-03		5.28E-05	4.63E-01	2.31E-04	7.21E-05	6.31E-01	3.16E-04	1.25E-04	3.33E-02	Below
Beryllium	7440-41-7	1.20E-05		1.44E-07	1.26E-03	6.31E-07	1.97E-07	1.72E-03	8.61E-07	3.41E-07	2.80E-05	Below
Cadmium	7440-43-9	1.10E-03		1.32E-05	1.16E-01	5.78E-05	1.80E-05	1.58E-01	7.89E-05	3.12E-05	3.70E-06	Exceeds
Chromium	7440-47-3	1.40E-03		1.68E-05	1.47E-01	7.36E-05	2.29E-05	2.01E-01	1.00E-04	3.97E-05	3.33E-02	Below
Cobalt	7440-48-4	8.40E-05		1.01E-06	8.83E-03	4.42E-06	1.38E-06	1.21E-02	6.03E-06	2.38E-06	3.30E-03	Below
Copper	7440-50-8	8.50E-04		1.02E-05	8.94E-02	4.47E-05	1.39E-05	1.22E-01	6.10E-05	2.41E-05	1.30E-02	Below
Manganese	7439-96-5	3.80E-04		4.56E-06	3.99E-02	2.00E-05	6.23E-06	5.45E-02	2.73E-05	1.08E-05	6.70E-02	Below
Mercury	7439-97-6	2.60E-04		3.12E-06	2.73E-02	1.37E-05	4.26E-06	3.73E-02	1.87E-05	7.38E-06	1.00E-03	Below
Molybdenum	7439-98-7	1.10E-03		1.32E-05	1.16E-01	5.78E-05	1.80E-05	1.58E-01	7.89E-05	3.12E-05	3.33E-01	Below
Nickel	7440-02-0	2.10E-03		2.52E-05	2.21E-01	1.10E-04	3.44E-05	3.01E-01	1.51E-04	5.96E-05	2.70E-05	Exceeds
Selenium	7782-49-2	2.40E-05		2.88E-07	2.52E-03	1.26E-06	3.93E-07	3.44E-03	1.72E-06	6.81E-07	1.30E-02	Below
Vanadium	1314-62-1	2.30E-03		2.76E-05	2.42E-01	1.21E-04	3.77E-05	3.30E-01	1.65E-04	6.53E-05	3.00E-03	Below
Zinc	7440-66-6	2.90E-02		3.48E-04	3.05E+00	1.52E-03	4.75E-04	4.16E+00	2.08E-03	8.23E-04	6.67E-01	Below

Notes:

<sup>1</sup> Criteria Pollutants emission rates from manufacturer-supplied emission factors, which are more conservative (higher) than EPA AP-42 factors. Except for Lead, which is from EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2.

Same emission factor applied for biogas and natural gas combustion (similar properties)...no biogas emission factors available

<sup>2</sup> PM emission factor is assumed to equal PM<sub>10</sub>.

<sup>3</sup> SO<sub>2</sub> Emission factor for biogas assumes 100% conversion of H<sub>2</sub>S to SO<sub>2</sub> ; for NG (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-2).

<sup>4</sup> Conservatively estimated H<sub>2</sub>S destruction based on engineering judgement and combustion properties of H<sub>2</sub>S

<sup>5</sup> Biogas toxic air pollutant emissions based on EPA AP-42 emission factors, times ratio of Biogas heat value to natural gas heat value, unless higher emisson factor available through SCAQMD.

<sup>6</sup> Emission factors from "General Instruction Book for the 2003 - 2004 Annual Emissions Reporting Program", Table 10 (Default Emission factors for Digester Gas Combustion) South Coast Air Quality Managment District (SCAQMD).

<sup>7</sup> Toxic Air Pollutant emission factors (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-3).

<sup>8</sup> Toxic Air Pollutant-Metals emission factors (EPA AP-42, Section 1.4 Natural Gas Combustion, Table 1.4-4).